A CORRESPONDENT of the *Journal* of the American Medical Association reports that an institute of preventive medicine has been established at Leyden, the first of the kind to be created in the Netherlands. On the administrative committee will serve Mr. W. J. M. Van Eysinga, professor at the Faculté du droit and rector of the University of Leyden; Mr. P. I. Idenburg, general secretary Professor Dr. J. A. Barge, of the faculté de médicine; Professor Dr. E. Gorter, of the faculté de médicine, and Dr. M. D. Horst, director of the medical service at Leyden. The institute has a threefold purpose: (1) the application of preventive measures to diseases; (2) the study of new problems of preventive medicine, and (3) the instruction of physicians and nurses, together with responsibility for publicity campaigns. The society will occupy itself particularly with prenatal care, the care of infants, children of preschool age, and school children, and the care of adolescents and adults. In addition, the institute will study, as far as possible, the prophylaxis of occupational diseases. At the start, only a part of the program can be carried out, but it is hoped that, with the aid of subscriptions, it will soon be possible to realize the entire program. The administration is composed of five persons, while the general committee comprises at least sixty members.

UNIVERSITY AND EDUCATIONAL NOTES

DR. CLARENCE STONE YOAKUM, director of the bureau of university research at the University of Michigan, has been appointed dean of the college of liberal arts at Northwestern University.

ASSISTANT PROFESSOR H. M. GEHMAN, of Yale University, has been appointed head of the department of mathematics at the University of Buffalo.

DR. W. H. CHANDLER, professor of pomology in the college of agriculture at the University of California, has been appointed head of the division of pomology. Dr. Chandler succeeds Dr. W. L. Howard, who has been appointed director of the branch of the College of Agriculture at Davis.

IN the school of chemistry at the University of Minnesota, Dr. George Glockler has been appointed associate professor of inorganic chemistry to replace Dr. R. E. Kirk, who becomes head of the department of chemistry at Montana State College; Dr. D. S. Villars replaces Dr. N. W. Taylor, who has leave of absence for 1929–30 to study in Berlin under a Guggenheim fellowship. Dr. R. E. Montonna has been promoted to an associate professorship of chemical engineering.

A. W. QUINN has been appointed instructor of mineralogy and petrography in the department of geology of Brown University. Mr. Quinn was with the U. S. Geological Survey during the past summer. He takes the place of Dr. M. E. Hurst, who has joined the staff of the Ontario Bureau of Mines.

DR. BENNO E. LISCHER, professor of orthodontics, Washington University, St. Louis, from 1901 to 1924, and since then special lecturer in orthodontics at the University of Michigan, has been appointed professor of orthodontics in the University of California.

PROFESSOR H. H. WOOLLARD has been appointed as from September 1 to the university chair of anatomy tenable at St. Bartholomew's Hospital Medical College, London.

MISS ELLEN GLEDITSCH has been promoted to a professorship in chemistry at the University of Oslo, where she has been an associate professor since 1916.

DISCUSSION

QUALITY VERSUS QUANTITY IN UNIVERSITY FACULTIES

IN SCIENCE for July 12 and 19 appear papers on the economic status of American university teachers by Professor B. R. Andrews, Dr. F. P. Bachman, Professor R. H. True and Professor H. F. Clark. These papers are from the symposium at the last annual meeting of the American Association for the Advancement of Science. Together with the report of Mr. Trevor Arnett, of the General Education Board, and the studies at the University of California by Peixotto and at Yale, these contributions make an extensive discussion of this subject.

As one who worked hard on one of these studies,[1] I venture to say that it is all wasted effort unless the members of the teaching profession obtain from it a clear understanding of what they have to do, both individually and through academic public opinion, if salaries are to go up. And salaries must go up if there is to be improvement, and not deterioration, in the quality of university teaching and particularly in the quality of university teachers.

Certainly our colleagues now have generally no such effective understanding of the essential elements in the situation. Only a day or two ago I heard one of them from a sister university express appreciation of the Yale study, together with the hope that it would influence salaries at his own institution. But in the next sentence he stated, and with evident satisfaction, that in the undergraduate school of his university the

[1] "Incomes and Living Costs of a University Faculty," edited by Yandell Henderson and Maurice R. Davie, Yale University Press, 1928.

tutorial system is to be introduced on a broad scale. Like the majority of our colleagues in all American colleges and universities he wants both to increase the number of the faculty and to have higher salaries. But the Yale report in its most important, and unfortunately least-noticed, section proved with mathematical decisiveness that the reason why the enormous sums of money which are annually added to the endowment of our educational institutions produce only a sluggish upward movement of salaries is that the number of salaried teachers is increased in nearly the same proportion as are the funds available for salaries.

Higher intellectual quality in the teachers is the most important element in better teaching. No new educational devices, however meritorious in themselves, such as the tutorial system, residential halls with separate staffs, etc., can contribute to the education of large bodies of students to a degree comparable with a few able teachers. A generally higher quality can be obtained only by a much higher salary scale. Therefore, the greatest improvement in our universities involves holding the faculties at approximately their present size until funds accumulate sufficient for higher salaries. So enormous are the sums now annually poured into our universities that there are few institutions which, if they met this condition and limited the increase in the faculty, would not be enabled within a decade to raise all salaries 50 to 100 per cent. At that higher level of salaries and ability new educational devices could be introduced with a much greater chance of proving effective than on the present level of salaries and ability.

This proposal, however, runs head on into collision with the idea, now prevalent, that college students can be taught effectively only in small classes. This idea is generally offered as the reason, or excuse, for the enlargement of the faculties to keep pace with the increase of students. Doubtless the highest grade teaching should be done in small classes or even tutorially. Doubtless the most valuable man is the productive scholar. Certainly there are many valuable teachers who lack the exuberant personality requisite to hold large classes. Yet surely not all teaching even in the large general subjects must necessarily be done only in small sections. If the small class, or rather the small division of all large classes, is carried much further than at present, the outlook for higher salaries is hopeless. University salaries are now at the level that mediocrity commands in other callings, and the intellectual level tends toward equality with that of salaries. The small-class idea is bringing into the faculties an increasing proportion of men who would be usefully employed as teachers in high and preparatory schools. They lack both the productive and the erudite impulses in scholarship. They have neither the personality nor the energy to teach a class of more than a few college students. They obtain university positions merely because of the demand for many teachers and the low requirements as to ability for teachers of small sections in general and elementary subjects.

Fortunately, neither low salaries nor the small-class trend nor the diminishing demand for teachers of vigorous personality have as yet entirely eliminated from college faculties men capable of teaching moderate-sized or even large classes effectively. Although such men are often too active-minded to achieve the most fundamental work of scholarship, yet because of their inherent energy they rarely fail to become leaders of their generation outside as well as within academic walls. At present, instead of being encouraged to teach large classes, such men are often made to keep step merely with the small-class teachers, lest the difference in the two types, the mediocre and the able, should be too evident.

The possibility of higher salaries, so far as the faculty can influence it, depends wholly on covering a larger number of student-hours per week with fewer, or at least without more, teachers. It is, therefore, strongly in the financial interest of the faculty as a whole to decrease the small-class type of teacher, except when he shows distinct scholarly ability, and to encourage every teacher, without increasing his courses or his hours in the classroom, to teach as large classes as he can efficiently.

But even this increase of the student-hours per teacher will effect only a sort of retail improvement in the salary situation. The wholesale side of the problem is one for which the responsibility rests on the higher executive officers and trustees of each university. There is public jubilation when funds for the addition of another school or institute in the university are announced. But for the faculty, and for those who desire improvement in the quality of the faculty, such additions should often be rather a cause of regret. Unless there is a clear and urgent need for the education and the research which the new school or institute may afford, it inevitably does more harm than good to the university and to general cultural advancement. By enlarging the faculty it renders any future sums for raising the level of salaries and ability proportionally less effective. Perhaps aviation is the next field in which such incompletely endowed schools will be added to our universities. It is highly probable that there is no university in the country in which funds devoted to this, or to any similar new educational enterprise, would not be more usefully employed in improving the already existing departments.

The essential point is that our universities are already vastly overextended, and yet they are continu-

ally being extended further. A railroad or factory which followed such a policy and allowed the quality of its staff to deteriorate, while continually absorbing new capital and expending it on new lines instead of on strengthening those already existing, would inevitably go bankrupt.

Let us face the facts. The universities are not now attracting ability into their faculties. Exceptions occur, but this is the rule. If the universities want a higher intellectual level, they will have to pay for it.

What, then, are the market prices of ability, mediocrity and inferiority? The Yale report shows that, as a general rule, at least in cities where it snows in the winter and houses have to be heated, the total annual living expenses of any family are about half the sale value of their residence. This rule applies fairly closely to the various grades of professional and business men, to clerks, mechanics and laborers, as well as to professors. It rests on the facts that 20 per cent. of the total annual expenditure of a household, or a little more, always goes for rent, real or virtual, and that a house or apartment rents for about 10 per cent. of its sale value. Thus a man's annual salary is about half the sale price of the house he can live in comfortably on that salary, and provide for his family.

From these relations it follows that, if a university wants a certain level of ability on its faculty, it is only necessary to get from the tax assessor's office the values placed on the houses in which live the economic class with that level of ability. It may be that of the leading lawyers, doctors, bankers and business men of the town, or merely the general run of the legal and medical professions; or bank clerks; or policemen; or day-laborers. Whichever it is, half the valuation of their homes is the approximate market price in that town for the corresponding level of ability.

Application of this principle to the present salary scales in our universities reveals the underlying cause of the increasing demand for "better teaching." This need is not met, but is rather increased, by each additional million now devoted to expansion. More teachers for smaller classes, new educational devices, additional departments, schools and institutes, larger and more imposing universities are all poor substitutes for a faculty of a high level of intellectual energy.

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ROUNDSTONE, A NEW GEOLOGIC TERM

EARLY in 1918, in the course of my work in the editor's office of the U. S. Geological Survey, I jotted down half a dozen quotations that showed considerable differences among geologists in the use of the words boulder, cobble, pebble and occasionally gravel, to indicate sizes of rounded fragments. Four years later C. K. Wentworth published in the *Journal of Geology* his schedule of grade terms, which is a sufficient guide to uniformity in that respect.

I wish to offer now, from my notes of 1918, the new term *roundstone* as a generic term to include the largest four sizes in Wentworth's schedule, boulder, cobble, pebble and granule. This term would be useful to designate the unassorted accumulations composed of two or more sizes of rounded stones that occur in many situations. It could fill the place incompletely filled by two or three terms in such statements as "all the pebbles and boulders are within a few feet of the surface"; "the largest patches contain gravels and cobbles at the base," and "the pebbles, cobbles and boulders were collected in groups of ten to seventy."

FREDERIK A. FERNALD

THE USE OF PARADICHLOROBENZENE IN THE CONSERVATION OF HERBARIA

DURING the past years we have been using paradichlorobenzene in substitution of naphthalene, in the conservation of the phanerogamic and mycological Herbaria of the Agronomical Station, with excellent result.

This substance, contained in test-tubes, was placed upon each drawer of the iron boxes, but there is no inconvenience in dusting it directly upon the plants placed on the Herbaria boards.

A comparative experiment was made with samples of *Cassia* and *Tipha*, which get easily damaged in the Herbarium.

Having dried some specimens and divided them into three lots, they were set in a place exposed to dust and moths. A first lot was left without any preserving substance; a second one was placed together with naphthalene dust on the cardboards, and the third one with paradichlorobenzene—the two latter with the same amount of preservative, by weight.

At the end of a year, the samples left without preservatives were almost totally destroyed; the ones treated with naphthalene were partially destroyed, especially the flowers and inflorescences, and the ones treated with paradichlorobenzene were not attacked.

The use of this substance, as compared with naphthalene, shows the necessity of replacing same more frequently on account of its easier volatility.

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